

AMENDMENTS TO THE CLAIMS

The following **Listing of Claims** replaces all prior versions and listings of claims in this application.

LISTING OF CLAIMS

Claim 1 (Canceled)

Claim 2 (Withdrawn): A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of activating the nitrogen-including gas and causing the activated nitrogen-including gas to react with metallic contaminant contained in a member in the reaction chamber so as to remove the metallic contaminant from the member.

Claim 3 (Withdrawn): A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising;

a deposit-removing step of removing a deposit stuck to an inside of the film-forming unit by supplying into the reaction chamber a cleaning gas that includes fluorine, and

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of activating the nitrogen-including gas and causing the activated nitrogen-including gas to react with the fluorine diffused into a member in the reaction chamber during the deposit-removing step, so as to remove the fluorine from the member.

Claim 4 (Currently amended) A cleaning method of a film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the method comprising:

a deposit-removing step of removing a deposit stuck to an inside of the film-forming unit by supplying into the reaction chamber a cleaning gas that includes fluorine, and

a purging step of purging an inside of the reaction chamber by supplying into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

wherein the purging step has a step of nitriding a surface of a member in the reaction chamber by activating the nitrogen-including gas, the deposit-removing and purging being in predetermined time sequence according to a recipe, the recipe comprising, for deposit-removal, loading at normal pressure, stabilizing at a first predetermined temperature range, cleaning at a maximum predetermined pressure range and, for purging, stabilizing, ammonia purging at a second, higher predetermined temperature range and a third predetermined pressure range between normal and maximum predetermined pressure ranges, stabilizing and unloading at said first predetermined temperature range and normal pressure.

Claim 5 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein

the nitrogen-including gas is ammonia, dinitrogen monoxide or nitric oxide.

Claim 6 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein

during the purging step, the inside of the reaction chamber is maintained at a range of 133 Pa to 53.3 kPa.

Claim 7 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein

during the purging step, the nitrogen-including gas is supplied into the reaction chamber heated to a predetermined temperature in order to be activated.

Claim 8 (Original): A cleaning method of a film-forming unit according to claim 7, wherein

during the purging step, the inside of the reaction chamber is heated to a range of 600 °C to 1050 °C.

Claim 9 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein

the member in the reaction chamber consists of quartz.

Claim 10 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein

the process gas comprises ammonia and a silicon-including gas,
the thin film is a silicon nitride film, and
the nitrogen-including gas is an ammonia gas.

Claim 11 (Previously presented): A film-forming method comprising
a cleaning step of cleaning a film-forming unit in accordance with a cleaning method of a film-forming unit according to claim 4, and

a film-forming step of heating the inside of the reaction chamber containing the object to be processed to a predetermined temperature, and forming a thin film on the object to be processed by supplying a process gas into the reaction chamber.

Claim 12 (Currently amended) A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising:

a nitrogen-including-gas supplying unit that supplies directly into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including-gas, the activating unit being a heating unit, [and]

a nitriding unit that nitrides a surface of a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas, and

a controller controlling, according to a recipe, the temperature within the chamber via said heating unit, controlling a flow of nitrogen-including gas via said nitrogen-including gas supplying unit, for controlling the nitriding unit in predetermined time sequence according to said recipe of loading at a first predetermined temperature range and normal pressure, stabilizing, film-forming at a second higher predetermined temperature range and a first predetermined pressure range different from normal pressure, purging and unloading at said first predetermined temperature range and normal pressure.

Claim 13 (Withdrawn): A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a contaminant-removal controlling unit that removes metallic contaminant from a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas and by causing the activated nitrogen-including gas to react with the metallic contaminant contained in the member.

Claim 14 (Withdrawn): A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising;

a cleaning-gas supplying unit that supplies into the reaction chamber a cleaning gas that includes fluorine,

a nitrogen-including-gas supplying unit that supplies into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including gas, and

a fluorine-removal controlling unit that removes fluorine from a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas and by causing the activated nitrogen-including gas to react with the fluorine diffused into the member.

Claim 15 (Currently amended) A film-forming unit that forms a thin film on an object to be processed by supplying a process gas into a reaction chamber containing the object to be processed, the film-forming unit comprising:

a cleaning-gas supplying unit that supplies directly into the reaction chamber a cleaning gas that includes fluorine and that is capable of being activated,

a nitrogen-including-gas supplying unit that supplies directly into the reaction chamber a nitrogen-including gas that includes nitrogen and that is capable of being activated,

an activating unit that activates the nitrogen-including-gas, the activating unit being a heating unit, [and]

a nitriding unit that nitrides a surface of a member in the reaction chamber by controlling the activating unit so as to activate the nitrogen-including gas and the cleaning gas according to a recipe, and

a controller for controlling the temperature within the chamber via said heating unit, for controlling a flow of nitrogen-including gas via said nitrogen-including gas supplying unit, for controlling the flow of cleaning gas via said cleaning-gas supplying unit, and for controlling the nitriding unit in predetermined time sequence according to said recipe of loading at a first predetermined temperature range and normal pressure, stabilizing, film-forming at a higher predetermined temperature and a second predetermined pressure range, purging and unloading at normal pressure and cleaning at a maximum predetermined pressure range at the first predetermined temperature range.

Claim 16 (Original): A film-forming unit according to ~~any of claims 12 to 15~~ claim 12 or 15, wherein
the nitrogen-including gas is ammonia, dinitrogen monoxide or nitric oxide.

Claims 17 and 18 (Canceled)

Claim 19 (Currently amended): A film-forming unit according to ~~any of claims 12 to 15~~ claim 12 or 15, wherein
the heating unit heats the inside of the reaction chamber to a range of 600 °C to 1050 °C.

Claim 20 (Currently amended): A film-forming unit according to ~~any of claims 12 to 15~~ claim 12 or 15, further comprising
a pressure-adjusting unit that maintains the inside of the reaction chamber at a range of 133 Pa to 53.3 kPa.

Claim 21 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein the cleaning gas comprises fluorine gas.

Claim 22 (Previously presented): A cleaning method of a film-forming unit according to claim 4, wherein the thin film is a silicon nitride film.